The Lamprididæ, Veliferidæ, and Lophotidæ have at one time or another been supposed to be related to the Scombriform Acanthopterygians, but these are a much more specialised group, without an orbitosphenoid and typically with a spinous dorsal fin, the anal preceded by spines, the ventrals composed of a spine and 5 soft rays, and the pelvic bones directly attached to the clavicles.

Boulenger has placed *Lampris* near the Gastrosteidæ, on the ground of an interpretation of the elements of the pectoral arch which has not received acceptance, but these differ widely from it in their anatomy and seem probably to have originated from the Haplomi near the Cyprinodontidæ and Scombresocidæ.

Jordan has stated that the Eocene *Semiophorus* is related to *Lampris*. Dr. Smith Woodward very kindly looked at the specimens of the extinct genus in the British Museum with me, and it seems on the whole probable that *Semiophorus* is not related to *Lampris* and *Velifer*, but to *Platax*, near which genus Dr. Smith Woodward has placed it.

In *Semiophorus* the vertebræ are 24 in number, the dorsal fin is covered with small scales, the anal fin is preceded by 3 spines, and the outer ray of the ventral fin is a short spine. It is probable that the soft rays of the ventral fin are 5 in number and much branched, and not so numerous as would appear from the current representation of this fish.

The Tæniosomi were regarded by Dr. Gill as possibly derived from the same stock as the Pleuronectidæ; whilst Boulenger, on the ground of the large number of rays in the ventral fins, considered them as probably related to the Beryciformes.

The remarkable *Stylophorus* has usually been placed with or near the Trachypteridæ. The single known specimen is not in good enough condition for me to offer any suggestion as to its relationships.

6. Zoological Results of the Third Tanganyika Expedition, conducted by Dr. W. A. Cunnington, 1904–1905.—Report on *Limnocnida tanganicæ*; with a Note on the Subspecies from the Victoria Nyanza. By R. T. Günther, M.A., F.R.G.S., Fellow of Magdalen College, Oxford *.

[Received May 22, 1907.]

(Plate XXXVII. † & Text-figures 172–174.)

The collection of the jelly-fish of Lake Tanganyika made by Dr. Cunnington in 1904 and 1905 is the best which has yet been brought to this country. 78 individuals, some in several hitherto undescribed stages of development, were obtained from three localities at four different dates from September to February,

* Communicated by the Secretary.

† For explanation of the Plate, see p. 656.

and therefore from the close of the dry season until well on into the season of the great rains. The excellent state of preservation of the material is greatly to the credit of the collector, and has facilitated my investigation of some of the problems presented by this enigmatical creature. Some specimens were exhibited at the Meeting of the Society on March 6, 1906, a notice of the exhibit appearing in the P. Z. S. 1906, p. 179.

It has been known for some time that at certain seasons of the year, three types of individuals—males, females, and those which reproduce asexually by budding—occur in the lake at the same time. Mr. Moir's collection, the first to reach Europe, showed that all coexisted during April, May, and June. As one of the results of his first expedition in 1897, Mr. J. E. S. Moore found that early in March a few large specimens were reproducing by budding, and that this process was so rapid that in a few weeks the bays and open waters became filled with immense shoals which in June and July extended for miles and miles. At the same time, sexually mature individuals appeared. In his account of a second expedition in 1900, Moore asserts that in September and October, only sexual forms which showed no tendency to produce buds were to be captured in the lake. On this evidence Moore believed that he had discovered the relation of the life-cycle of *Limnocnida* to the wet and dry seasons—viz., reproduction by budding during the dry months, and sexual reproduction only during the wet winter months.

Dr. Cunnington's collections made during the wet season show that this theory cannot be upheld, for all contain asexual individuals exhibiting active bud-formation on their manubria, and these asexual individuals even outnumber the individuals with smooth manubria.

The collections are, moreover, characterised by the entire absence of any mature females; a fact which seems all the more remarkable, because in a small collection of *Limnocnida* from Victoria Nyanza which had been formed in August, and had been submitted to me for examination (p. 650) all the individuals were female.

Stated in a tabular form the present state of our knowledge regarding the seasonal distribution of *Limnocnida* is as follows:—

Dry Season.	March.	Few large budding medusæ (Moore, 1897).
	April. May. June.	♂, ♀ and budding medusæ coexist (Moir, 1893).
	June. July.	♂, ♀ and budding medusæ in shoals (Moore, 1897).
	August. September.	♂ and budding medusæ (Cunnington, 1904).
Season of Great Rains.	December.	♂ and budding medusæ. Many very young individuals. No ♀ individuals.
	February.	Old and young ♂ and budding medusæ (Cunnington, 1904).

We are therefore compelled to the view that the asexual method of reproduction is the most usual one in Lake Tanganyika throughout the year, and that the sexual method may be confined to a definite season; the earliest date at which it has been observed is in the month of May, and we have as yet no evidence for its continuance beyond the month of July.

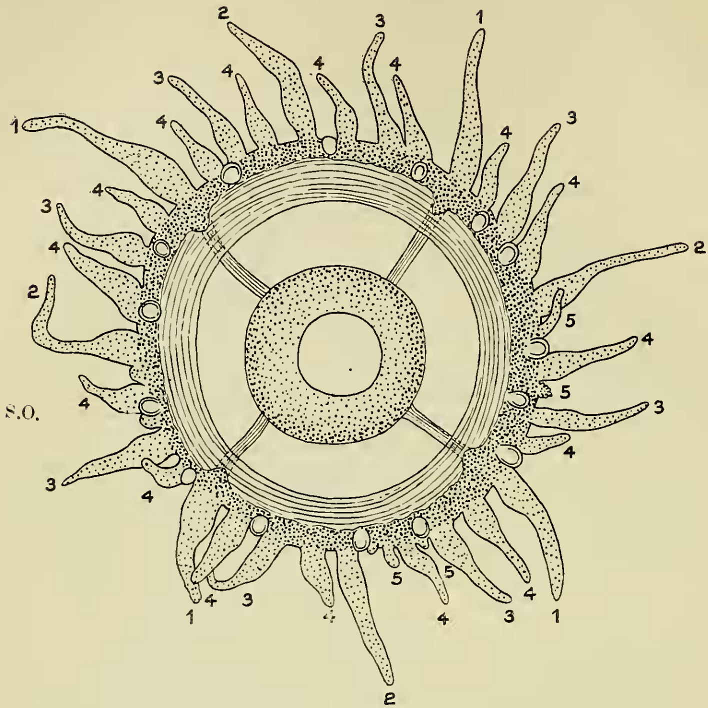
It is much to be regretted that no light has hitherto been shed upon the process of development from the egg. We have no sufficient reason for believing that the organisms described by Moore as the planulæ or larvæ of the *Limnocnida* really were such, and the existence of any free hydroid stage is as doubtful as ever. However, one fact of importance has been confirmed by all observers, namely, that the medusa may suddenly appear on the surface in countless numbers, in shoals many miles in length, and as suddenly disappear so that none are to be seen for a month or more.

The excellent state of preservation of Dr. Cunnington's material has enabled me to realise the natural appearance of a living *Limnocnida* when swimming, more perfectly than when I received Mr. Moir's first consignment of preserved material. The longer and older tentacles are carried somewhat stiffly above the exumbral surface of the medusa (Pl. XXXVII.), while the smaller and younger series of somewhat clubbed "velar" tentacles, as they are sometimes called, curve round the umbral rim. Tentacles of intermediate length occupy intermediate positions, and so the living animal can erect over its back a very efficient *chevaux de frise* armed with nematocysts for offence and defence. This fashion of carrying the tentacles is like that adopted by *Limnocodium* and *Olindioides*, in which latter form the tentacles adhere to the exumbrella along a more considerable proportion of their length than in *Limnocnida*, an adhesion which affords greater stability to the system.

Another point on which Dr. Cunnington's collection throws welcome light, is that of the succession and development of the tentacles. While still attached to the parent, the young medusa-buds develop the first two orders of tentacles in the per- and interradii (Pl. XXXVII. fig. 7). The youngest free-swimming stages in the collection, 2 millimetres in diameter, have the tentacles of the fifth order just commencing to sprout (text-fig. 172). Between these young stages and the oldest with tentacles of the eighth order and 22 millims. in diameter, the intermediate stages are fairly completely represented.

The peculiar sense-organs first become conspicuous in young medusæ in which tentacles of the fifth order are appearing, but they are not invariably present at this stage. In the youngest animals in which they were detected, there were four (text-fig. 172) in each quadrant, or 16 in all, although minor irregularities may occur, as in the specimen shown in text-fig. 172, in which only 15 sense-organs were present, and thenceforth they increase in number, until they are so numerous and crowded as to be almost touching one another all round the circumference of the medusa (text-fig. 174, S.O.).

Text-fig. 172.

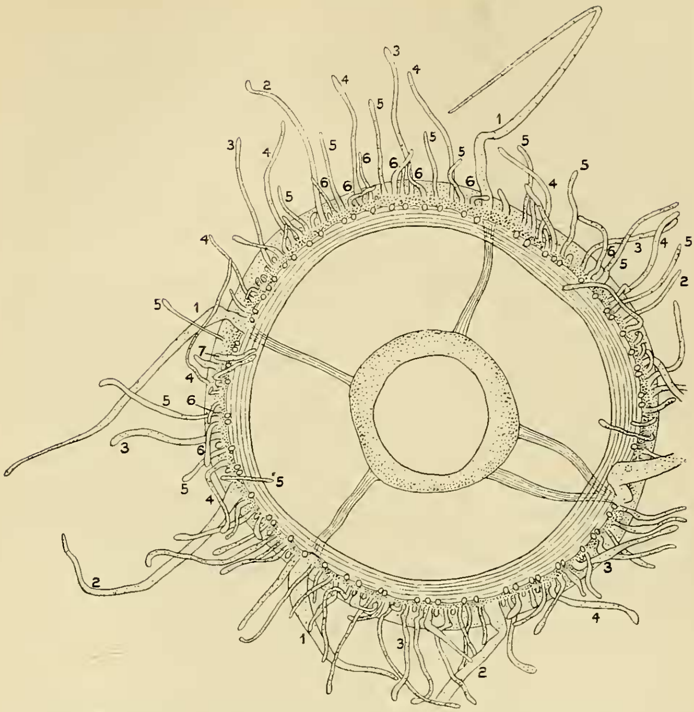


Young *Limnocnida*, 2 millimetres in diameter.

The numerals indicate the orders of the tentacles.

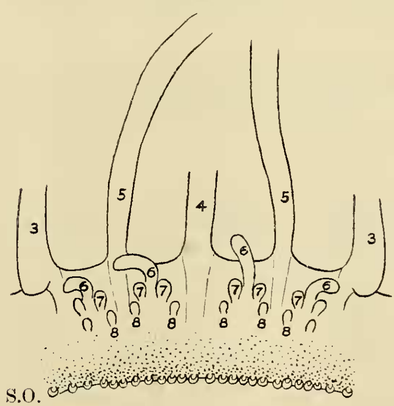
Endodermal Organ and Nutrition.—Among other problems which yet remain to be solved is that of the function of the remarkable accumulation of roundish cells in the circular canal. These cells have several nuclei apiece and many have one or two vacuoles. In the original description, an excretory function was suggested on the assumption that these cells were derived from the endoderm of the animal itself. On reexamining this so-called endodermal organ in better preserved material, I have found amœboid cells among the others (Pl. XXXVII. fig. 3), but feel more than ever in the dark with respect to their function, although probably it is in some way connected with the metabolism of the medusa. We hope that some naturalist having the opportunity may thoroughly investigate the method of nutrition of the living animal, bearing in mind the possibility of the growth of a parasitic or symbiotic fungus or alga in such a position. The wonderfully large mouth which the short manubrium seems inadequate to close, leads one to suspect some such peculiarity in the nutrition of *Limnocnida*.

Text-fig. 173.



Young *Limnocnida*, 6 millimetres in diameter, with five radial canals.

Text-fig. 174.



Portion of periphery of *Limnocnida*, 22 millimetres in diameter.

Radial Canals and Radial Symmetry.—In all large collections of *Limnocnida*, several individuals occur which exhibit numerical variation in the radial canals. (*Cf.* tables on pp. 648–650). Among 70 individuals of all ages brought home by Mr. Cunnington in which the radial canals could be counted, 54 showed the typical number of radial canals (4), 9 had 5 radial canals, 6 had 6, and 1 had 7 radial canals, so that as large a proportion as 24 per cent. have 5 or more radial canals. In this connection it is interesting to note that the numerical variation of the tentaculocysts of *Aurelia aurita* was found by Browne (Biometrika, vol. i.) to affect nearly as large a percentage (20·9–22·8 per cent.) of the individuals showing the normal number.

In many medusæ in which "supernumerary" radial canals occur, the additional canals are clearly seen to be due to the bifurcation, near the gastric cavity, of one or more of the normal number of radial canals. In no specimen of *Limnocnida*, and sixteen were examined, was this seen to be the case: all the radial canals proceeded independently from the gastric cavity to the circular canal; the confluence shown in text-fig. 173 being quite exceptional.

As might be expected, the order of the appearance of tentacles and the number of sense-organs tend to become more irregular in the case of individuals with 5 or more radial canals. *E.g.*, in the case of three individuals of different ages, and 14, 7 and 4·5 mm. in diameter, the numbers of the sense-organs in each fifth of the periphery were

III *a*. 40 + 35 + 48 + 40 + 41 = 204.
f. 19 + 21 + 21 + 22 + 18 = 101.
i. 10 + 6 + 6 + 6 + 8 = 36.

And so too, in the case of individuals with the normal number of tentacles, tentacles of a particular order are often fully formed in one quadrant before there is any sign of them in another.

Such variations may be expected to be frequent in the case of medusæ in which a numerically high grade of radial symmetry is reached.

Detailed Report on the individual specimens of Limnocnida *collected by Dr. Cunnington.*

I. Date: August 31, 1904. Locality: Niamkolo Bay.

	Diam. in millims.		No. of Radial Canals.	No. of Sense Org.	Order of Tentacles.	Char. of Manubrium.
	Umbrella.	Manubrium.				
a......	18	12	4	83×4	VIII.	Smooth.
b......	15	8	5	...	VIII.?	Smooth.
c......	14	9·5	4	...	VIII.	Buds (8 tent.).
d......	14	9	4	75×4	VIII.	Buds (8 tent.).
e......	14	8	4	...	VIII.?	Sm. (ribbed).
f......	13	7	5	...	VII.	Sm. (ribbed).
g......	10	7	4	...	VII.	Buds.

II. Date: September 9, 1904. Locality: Niamkolo Bay.

	Diam. in millims.		No. of Radial Canals.	No. of Sense Org.	Order of Tentacles.	Char. of Manubrium.
	Umbrella.	Manubrium.				
a......	22	15	4	106×4	VIII. (appearing)	Sm. (ribbed).
b......	22	15	4	...	do.	Young buds.
c......	22	15	4	...	do.	Buds (8 tent.)
d......	22	15	4	...	do.	Smooth.
e......	21	14	4	...	do.	Buds.
f......	20	14	4	...	do.	Buds.
g......	20	14	4	...	do.	Smooth.
h......	18·5	14	4	...	do.	Buds.

III. Date: December 20, 1904. Locality: Kibwesi.

	Diam. in millims.		No. of Radial Canals.	No. of Sense Org.	Order of Tentacles.	Char. of Manubrium.
	Umbrella.	Manubrium.				
a......	14	8	5	204	VIII.	Buds.
b......	13	8	6	.	VII.	
c......	13	8	4	...	VIII.?	..
d......	13	7	...	...	.	...
e......	10	4·5	..	...	...	...
f......	7	3·5	5	101	VII.	Smooth.
g......	6	2·5	5	68	VII.	...
h......	6	2·5	6	14×4	VI.	..
i......	4·5	2	5	36	V.	.
j......	4	2·25	4	...	V.	..
k......	4	1·5	5	...	V.	
l......	4	1·5	4	?8×4	VI.	.
m......	4	1·5	4	...	V.	.
n......	4	1·5	4	...	V.	
o......	3·75	2	4	...	VI.	.
p......	3·5	1·5	4	8×4	VI.	.
q......	3·5	1	4	...	V.	.
r......	3	1·5	4	...	V.	.
s......	2·75	1·5	...	...	..	
t......	2·75	1·25	...	...	...	.
u......	2·5	1·25	5	...	V. (appearing).	
v......	2·5	1·25	4	Yg. S. O.	...	..
w......	2·5	1·25	4	...	V.	
x......	2·5	1	4	...	V.	
y......	2·25	1	4	...	V. (not all round).	
z......	2	1	4	...	V. (not all round).	
α......	2	·75	...	...	...	.
β......	2	·75	4	...	V. (just appearing).	

IV. Date: February 21, 1905. Locality: Menza.

	Diam. in millims.		No. of Radial Canals.	No. of Sense Org.	Order of Tentacles.	Char. of Manubrium.
	Umbrella.	Manubrium.				
a	17	12·5	4	very numerous.	VIII.	Buds.
b	16	9	4	very numerous.	VIII.	Young buds.
c	15	10	4	...	VIII.	...
d	14·5	9	4	36×4	VII.	Buds.
e	14·5	9	4	...	...	...
f	14·5	8	4	...	IX app.	Smooth.
g	14	9	4	...	VII.	Small buds.
h	13	6	4	26×4	...	Smooth.
i	11	5	4	...	VIII.	...
j	9	4·5	...	...	VII.	...
k	8	4·75	6	? 97	VII. app.	Smooth.
l	8	2·5	4	21(–18)×4	VI.	...
m	7·75	3·25	4	18×4	VII. app.	Smooth.
n	7·5	4·25	7	...	VI. app.	...
o	7·5	4	4	...	VIII. app.	...
p	7·5	4	4	26×4	VII. app.	Smooth.
q	7	4	4	...	V.	...
r	7	3	6	...	VI–V	...
s	6·25	2·75	4	...	VII. app.	...
t	5·5	2·25	4	...	VII. app.	...
u	5	2·75	4	...	VI.	...
v	5	2·5	5	...	VI. app.	...
w	5	2	4	16(–15)×4	VI. app.	...
x	5	1·75	4	18×4	VI. app.	...
y	5	1·75	4	...	VI. app.	...
z	4·25	2·25	6	76	VI.	...
α	4·25	2	...	...	VI.	...
β	4·25	2	6	...	V.	...
γ	3·5	1·75	4	9×4	V.	...
δ	3·5	1·25	4	...	V. app.	...
ε	3·5	1·25	4	...	V. app.	...
ζ	3·25	1·25	4	8×4	V.	...
η	3	1	4	8(–9)×4	V. small.	...
θ	2	·75	4	8×4	V. app.	...

For the sake of comparison a similar table is appended for *Limnocnida tanganicæ* var. *victoriæ* obtained by Sir Charles Eliot.

Date: August 31, 1903. Locality: Kisumu, Victoria Nyanza.

	Diam. in millims.		No. of Radial Canals.	No. of Sense Org.	Order of Tentacles.	Sex.
	Umbrella.	Manubrium.				
a	13·5	8	4	circ. 30×4	VII.	mature ♀.
b	13	7·5	4	„	VII.	mature ♀.
c	12·5	8	4	„	VII.	mature ♀.

LIMNOCNIDA TANGANICÆ * var. VICTORIÆ.

On comparing some shrunken and rather battered specimens of *Limnocnida* obtained by Sir Charles Eliot, K.C.M.G., from the Victoria Nyanza, with the Tanganyika material, I considered that I could detect differences in the specimens from the Victoria Nyanza which may be regarded as sub-specific in importance: the proximal ends of the older tentacles are more deeply sunk in the jelly of the ex-umbrella than is the case in *Limnocnida tanganicæ* and the jelly-mass is more deeply grooved in consequence (Pl. XXXVII. figs. 4 & 5).

About one third of the length of the older tentacles is smooth and free from nematocyst warts, which are confined to the distal two-thirds. The proximal ends of the tentacles which are adherent to the exumbrella are specially supported by the development of grooved lumps or ridges of jelly in which they lie. I have never seen these so strongly developed in any *Limnocnida* from Lake Tanganyika. The sense-organs were numerous, and very prominent on the margin of the umbrella.

The specimens examined were all females of about the same age, with mature ova on the manubrium, and with tentacles of the VIIth order.

This collection was referred to by Prof. Sir Ray Lankester, at a meeting of the Zoological Society on December 1st, 1903. The medusæ were captured by Mr. Hobley at Kisumu on August 31, 1903, and had been preserved in a 5 % solution of formalin.

The extremely interesting fact of the occurrence of a form apparently identical with *L. tanganicæ* in the delta of the river Niger about 102 geographical miles from the sea, proves that *Limnocnida* must no longer be regarded as peculiar to the deep-water lake Tanganyika, but that it has a wide distribution in the fresh waters of tropical Africa. And as a consequence the halolimnic theory, according to which Tanganyika is a persistent Jurassic sea, in so far as it has been based upon the belief of the *exclusive* occurrence of *Limnocnida* in that lake, falls to the ground.

With regard to the details of the change from a marine to a fresh-water environment, we have yet much to learn from a more searching study of Central African geology. Of all the theories which have yet been proposed, we find ourselves most in agreement with that outlined by Mr. Boulenger for the benefit of the British Association in South Africa (1905), but the details of this theory of a wide-spread Eocene Sea still require working out.

More recently an original speculation has been published by Prof. Sollas. Of *Limnocnida* my imaginative friend writes ('Age of the Earth,' p. 209)—" If while in the hydroid stage, it grew

* This would seem an appropriate occasion for advocating a more reasonable uniformity in the spelling of this specific name; and although in my original paper I had followed Böhm's spelling *tanganyicæ* in accordance with the laws of priority, in the present communication the more usual and shorter form *tanganicæ* is adopted. I have noted *tanganyicæ*, *tanganicanus*, *tanganicensis*, *tanganyikæ*, *tanganyicensis*, *tanganikæ*, and in Sollas's 'Age of Earth,' p. 209, *tanganyicoea* (!)

attached to the outer skeleton of some actively locomotive animal, such for instance as one of the reptiles which abounded in Mesozoic times, and even at a later date, then, on the further supposition that its host sometimes made excursions from the sea into fresh-water, we should have a means by which the hydroid might be introduced."

Unfortunately for this theory, there is no evidence of any fixed hydroid stage in *Limnocnida*, indeed the evidence is all against the existence of one: *Aurelia aurita*, *Crambessa tagi*, and *Mœotias* have all left the sea without the aid of a marine reptile: *Halmonises lacustris* was probably helped into fresh-water by tidal agencies alone, and, as Sir Ray Lankester has suggested, *Limnocodium* may not pass through a fixed hydroid stage at all!

The Systematic Position of Limnocnida.

The position of *Limnocnida* in the Haeckelian System is still a matter under discussion. Judged by the chief diagnostic characters of endodermal sense-organs and manubrial gonads, *Limnocnida* should be one of the Narcomedusæ; but, on the other hand, Narcomedusæ are distinguished by characters so peculiarly their own, that *Limnocnida* cannot be considered as being at all closely related to them. Moreover, I know of no Anthomedusan which at all resembles it, except in the position of the gonads on the manubrium.

On the other hand, the grade of development which *Limnocnida* has reached is very closely paralleled by that of the other fresh-water medusa *Limnocodium*, more especially in regard to the tentacles and sense-organs, as I have already pointed out in an earlier communication. More recently (1903) Seitaro Goto has published illustrations of the sense-organs of the marine *Olindioides* clearly showing them to be of the same type. This distinguished Japanese naturalist has associated *Olindioides*, *Halicalyx*, and *Gonionema* with the Olindiadæ, which he regards as a subfamily of Eucopidæ (we believe wrongly) and near which he believes that both *Limnocodium* and *Limnocnida* may be most naturally placed.

The Olindiadæ are defined as Eucopidæ (see below) with two sets of tentacles, velar and exumbrellar, the former springing close to the base of the velum, and the latter at variable distances from it, but always from the exumbrella and connected with the circular canal by endodermal roots: marginal vesicles numerous, two on either side of the bases of the exumbrellar tentacles: manubrium well developed and quadrate, with distinct lips: radial canals four or six: gonads primarily continuous folds of the walls of the radial canals: with an adhesive disc on each exumbrellar tentacle.

The greater part of this definition applies quite well to the fresh-water *Limnocodium sowerbyi*, with the exception that this species, not being a creeping form, has tentacles without adhesive discs, and has also sac-like gonads.

Limnocnida too, shows a similar type of structure excepting that the gonads are situated on the manubriun in a zone in which bud-formation normally occurs, and would consequently belong to the Anthomedusæ or to a division of medusæ with manubrial gonads which, according to the System of Haeckel, are absolutely distinct from the Olindiadæ, *Limnocodium*, or any other medusæ with radial gonads. We have therefore an indication that the time has arrived for a reconsideration of the value of the characters upon which this System is founded. May they not tend to an artificial rather than to a natural classification of medusæ?

On the whole we incline to the opinion that the hard and fast division of medusæ into those with radial and those with manubrial gonads must be abandoned in the case of these fresh-water forms. We cannot imagine that the detailed resemblances which exist between *Limnocodium*, *Limnocnida*, and the Olindiadæ are the result of convergent evolution. A simpler hypothesis is that these forms are descended from a common ancestor, but that the place of development of the germ-cells has changed.

Arguing from known facts about the migratory proclivities of germ-cells in Hydroids in general, and from the history of the germ-cells of *Obelia* in particular, in which Leptomedusan the germ-cells, although maturing in pouches of the radial canals, originate in the wall of the manubrium itself, there is good ground for the view that *Limnocnida* in respect of its manubrial gonads preserves an early stage in the phylogenetic history of *Limnocodium*. Just as Odontornithes are none the less birds because they have teeth, so *Limnocnida* would be a Trachomedusan in spite of its manubrial gonads.

One other taxonomic problem has still to be dealt with. In Haeckel's system the Olindiadæ are regarded as a subfamily of the Trachomedusan Petasidæ, which have blind centripetal canals between the radial canals, and are thereby distinguished from the Petachnidæ. Goto, however, does not consider the presence of such canals to be of any systematic moment, since they may be present or absent in closely related genera. It is to be remembered that such centripetal canals, as well as the marginal ring of nematocysts, are well marked Trachomedusan features.

The Olindiadæ have usually been regarded as Trachomedusæ, until four years ago when Seitaro Goto made an examination of young stages of the sense-organs of *Olindioides formosa* and of *Gonionema depressum*. He found that the first rudiment consisted of a small segregation of *ectodermal* cells hardly distinguishable from the rest, closely applied to the endoderm of the circular canal at the point where the two kinds of cells meet (pl. ii. fig. 15), and he goes on to add that "there cannot be any reasonable doubt that the rudiment consists exclusively of *ectoderm cells*, since the boundary line between the two cell-layers is always distinguishable with a good objective."

In consequence Goto removed the Olindiadæ from the Trachomedusæ and ranged them with the Leptomedusæ, considering them as a subfamily of Eucopidæ. With this conclusion my own observations are at variance, and we do not consider that Seitaro Goto's own drawing (pl. ii. fig. 15) makes his statement evident.

With the aid of Dr. Cunnington's material I have again been able to confirm my original observation that the axial cells of the sense-organs of *Limnocnida* are derived from the *endoderm* of the circular canal. I have repeated the same observation in the case of *Olindias mülleri* while at Naples, and in the latter observation I believe I have the support of Sir Ray Lankester.

In both cases I have not been able to distinguish any boundary line between ectoderm and endoderm in the youngest stages of the sense-organs, although a distinct mesoglœal lamina appears between the two layers when the sense-organ approaches full growth. A further indication of the endodermal nature of these cells is afforded by an observation of Seitaro Goto himself, who admits that the central cells of the organ " stain the same colour as the endoderm, while the lining epithelium and the investing cells stain like the ectoderm."

In conclusion then, *Limnocnida* is to be regarded as a Trachomedusa related to the Olindiadæ and to *Limnocodium*, both of which it closely resembles in important respects, but it differs from all other known Trachomedusæ in that the gonads develop upon the walls of the manubrium. *Olindioides* and *Gonionema* differ from *Limnocnida* in the presence of centripetal canals and in the fact that their tentacles are provided with adhesive discs for use in creeping. In *Limnocodium* the vesicles enclosing the sensory bodies are elongated and extend into the velum, in *Limnocnida* they do not. *Limnocnida* too is characterised by its power of reproduction by budding from the manubrium.

The consequential changes in the scheme of classification cannot be regarded as more than tentative, for the details of the structure of many of the Haeckelian genera are still unknown. A most important character for taxonomic purposes is undoubtedly that of the structure of the sense-organs—whether they project freely beyond the margin of the umbrella as sensory clubs, or whether they are sunk and enclosed in vesicles. On these lines, Browne has divided the Petasidæ into the subfamilies Petachnidæ (with sensory clubs) and the Olindiadæ (with sensory vesicles). It is to the division of Olindiadæ without adhesive discs on the tentacles that I would provisionally refer *Limnocodium* and *Limnocnida*.

TRACHOMEDUSÆ.

Sense-organs with endodermal axis; gonads usually radial; development without a fixed hydroid stage.

[The radial position of the gonads is believed to have been derived from a manubrial position. *Limnocnida* is believed to have "thrown back" to the older condition. *Limnocodium* has never been *proved* to pass through a fixed hydroid stage.]

Family PETASIDÆ.

Radial canals 4 (or 6) in number; stomach without a peduncle.

Subfamily 1. Petachnidæ.

Sense-organs, projecting clubs.

Petasus, *Petasata*, *Dipetasus*, *Petachnum*.

Subfamily 2. Olindiadæ.

Sense-organs, enclosed in vesicles.

Group A. Tentacles without adhesive discs.

Marine forms.

Aglauropsis (? including *Mæotias*).

Gossea.

Olindias (? including *Halicalyx*).

Freshwater forms.

Limnocodium. Gonads radial, sac-like. Vesicles of sense-organs elongated and continued into velum.

Limnocnida. Gonads manubrial. Vesicles of sense-organs spherical or ellipsoidal. Asexual reproduction by budding.

Group B. Tentacles with adhesive discs.

Gonionemus, *Gonionemoides*, *Vallentinia*, *Olindioides*.

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